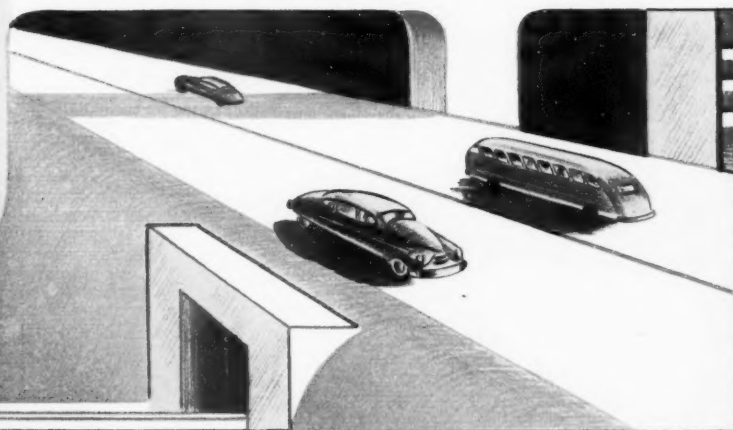
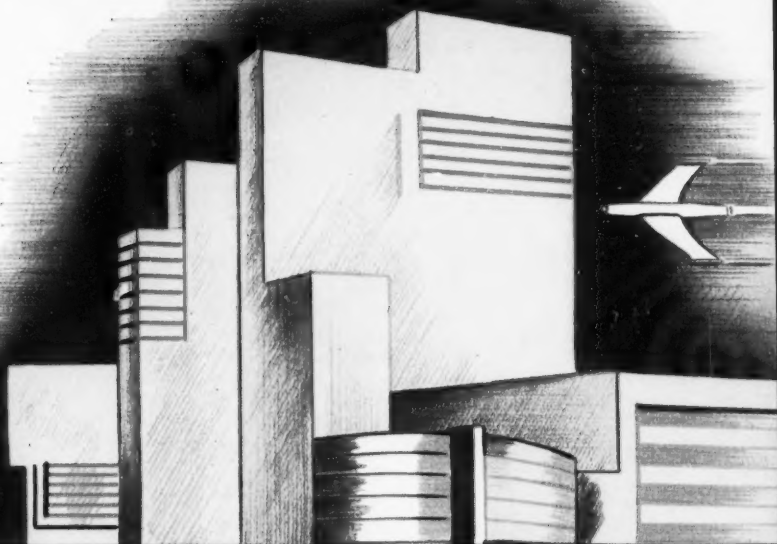


# *The* CRUSHED STONE JOURNAL



PUBLISHED QUARTERLY

## In This Issue

- Outstanding Program Completed for Miami Beach Convention
- Russell Rarey—In Memoriam
- A Graphical Method of Combining Sizes of Aggregates for a Specification
- B. D. Tallamy to be Federal Highway Administrator
- Lessons Learned From Minor Injury Accidents in the Cement and Quarry Industry

December 1956

OFFICIAL PUBLICATION • NATIONAL CRUSHED STONE ASSOCIATION

# **Technical Publications** of the **National Crushed Stone Association**

## ***STONE BRIEFS***

- No. 1. How to Proportion Workable Concrete for Any Desired Compressive Strength
- No. 2. How to Proportion Concrete for Pavements
- No. 3. Uses for Stone Screenings
- No. 4. How to Determine the Required Thickness of the Non-Rigid Type of Pavement for Highways and Airport Runways
- No. 5. The Insulation Base Course Under Portland Cement Concrete Pavements

## ***ENGINEERING BULLETINS***

- No. 1. The Bulking of Sand and Its Effect on Concrete
- No. 2. Low Cost Improvement of Earth Roads with Crushed Stone
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- No. 5. Reprint of "Comparative Tests of Crushed Stone and Gravel Concrete in New Jersey" with Discussion
- No. 7. Investigations in the Proportioning of Concrete for Highways
- No. 9. Tests for the Traffic Durability of Bituminous Pavements
- No. 11. A Method of Proportioning Concrete for Strength, Workability, and Durability. (Revised November 1953)

*Single copies of the above publications are available upon request.*

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# The Crushed Stone Journal

Official Publication of the NATIONAL CRUSHED STONE ASSOCIATION

J. R. BOYD, Editor

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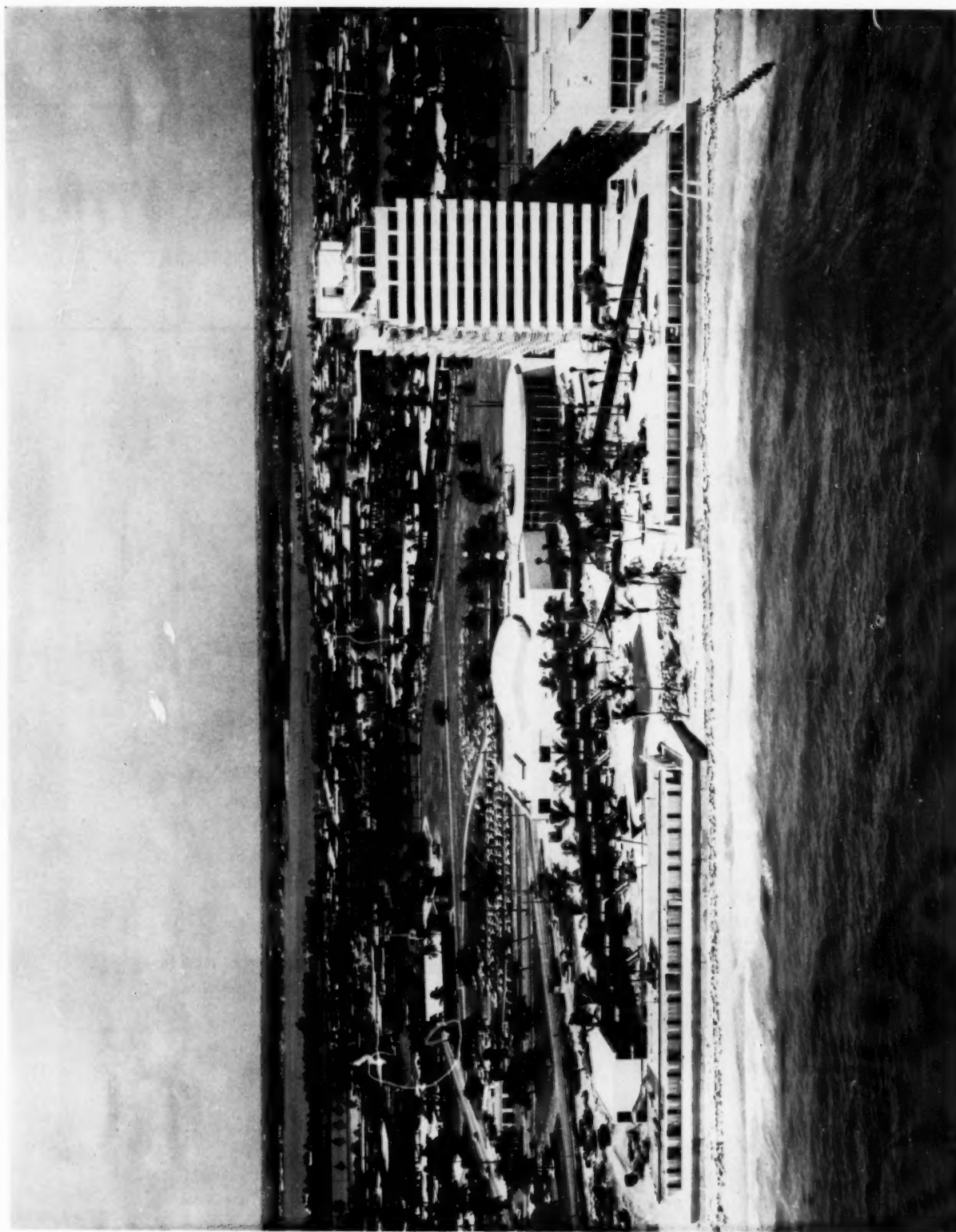
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AMERICANA HOTEL, BAL HARBOUR, MIAMI BEACH, FLORIDA  
HEADQUARTERS FOR THE 40th ANNUAL CONVENTION NATIONAL CRUSHED STONE ASSOCIATION

# THE CRUSHED STONE JOURNAL

WASHINGTON, D. C.

Vol. XXXI No. 3

PUBLISHED QUARTERLY

DECEMBER 1956

## Outstanding Program Completed for Miami Beach Convention

### Advance Registration Forecasts Excellent Attendance

**T**HE outstanding event of 1957 for quarry operators and everyone interested in the crushed stone industry will be the 40th Annual Convention of the National Crushed Stone Association.

To be held on January 15, 16, and 17, in the Bal Harbour Area of Miami Beach, Florida, this will be the first national meeting of NCSA ever held in the Sunshine State, and the combination of mixing business with pleasure in the famous vacation spot of Florida has stimulated unusual preconvention interest throughout the crushed stone industry. A new and beautiful oceanfront hotel, the Americana, will serve as Convention headquarters, and advance registrations indicate one of the largest off-show year gatherings of crushed stone producers in NCSA Convention history. Attendance is expected from all sections of the United States and from Canada.

#### Advantages of Attendance

Those who attend will profit greatly from the careful planning of the three-day program. In developing the sessions, no segment of the crushed stone industry was overlooked by the Convention Arrangements Committee under the able guidance of Chairman A. L. Worthen. Topics of vital concern—latest developments of the highest significance to every producer of crushed stone will be presented at each session. Nationally known speakers will bring you messages on subjects that directly affect you and your business. Members of our industry will share the platform spotlight as they tell of new developments in operating procedures and of the

progress being made in areas of the greatest importance to your future business.

The Special Operating Session on Thursday morning, January 17, will be of particular interest and value to operating men. Chairman C. E. Hogeboom and his Committee of operating men have left no stone unturned in arranging for the presentation of three highly important subjects to precede a 5-subject panel of operating men, each of whom will emphasize the necessity to obtain quality in all methods of production.

Many of the benefits to be gained through attendance at this Convention are not found in the printed program. At no other time during 1957 will you have a similar opportunity to meet with so many members of your industry. In Miami Beach you can visit with friends of long-standing—make new friends—establish new sources of valuable contact—and profit through the exchange of ideas and fresh viewpoints that are always so prevalent during NCSA Convention time. Representatives of members of the NCSA Manufacturers Division will be on hand to offer advice and counsel on production problems of a specialized nature as well as to acquaint you with knowledge of the latest equipment.

Prominent, too, will be the popular social hours to provide the proper balance of pleasure against the more serious aspects of the program. Plenty of free time, two afternoons and one evening out of the three Convention days, has been set aside to enable you to relax and enjoy the many different and interesting forms of entertainment for which



Miami Beach and the surrounding Florida area are noted.

### **New Americana Hotel to Serve as Headquarters**

An additional treat is in store for you, too, in the spacious ultra-modern accommodations you will enjoy in the Bal Harbour area—and at special Convention rates. Seven Bal Harbour Convention Group Hotels, the Americana, Balmoral, Sea View, Colonnade, Bal Harbour, Ivanhoe, and Kenilworth are side by side, and each is within easy walking distance of the remaining six hotels. Styled for comfort and convenience in an atmosphere of the tropics, each hotel overlooks the green Atlantic Ocean and offers the privacy of beach cabanas on the dazzling white sands as well as the privacy of a hotel swimming pool complete with tropical patio.

The Americana, headquarters for the 40th Annual NCSA Convention, had its grand opening in December of this year, and those in attendance will be captivated by this newest of the world-famous Miami Beach "Gold Coast" hotels. The Americana more than lives up to its billing as "The Hotel of the Americas," and you have only to visit the Dominion Coffee House, Carioca Lounge, Medallion Dining Room, Gaucho Steak House, Starlite Patio, or the spectacular Carnival Supper Club to find "The Spirit of the Americas" beautifully and strikingly represented by superb settings, original in design and colorful in concept. All NCSA meetings will be held in the Americana.

Truly, the 40th Annual Convention of the National Crushed Stone Association will be a profitable and unforgettable investment for everyone interested in the crushed stone industry. Executives, salesmen, superintendents, operating men—all will find the diversified program interesting, entertaining, and highly beneficial.

### **Make Hotel Reservations Now**

Before bringing you some of the 1957 program highlights, we would like to remind you to send in your hotel reservations immediately if you have not already done so. Convention time is near, and even though there will be room for all in the Bal Harbour Convention Hotel Group, an early reservation will assist you to obtain the type of accommodations desired. Hotel reservations should be made direct to the Bal Harbour Convention Hotel Group, 9701 Collins Avenue, Bal Harbour, Miami Beach,

Florida. Should you need additional hotel reservation cards, please contact the Washington office of the National Crushed Stone Association.

You are also urged to register in advance for the Convention. This will help you in further eliminating last minute details. Special advance convention registration cards have already been mailed and prompt return of this card to Association headquarters in Washington will have your convention badge ready and waiting for you upon arrival at Convention headquarters in Miami Beach. Registration cards can be obtained upon request to Association headquarters in Washington.

### **Program Highlights**

A message of welcome to delegates by NCSA President Norman E. Kelb on the morning of Tuesday, January 15, signifies the formal opening of the 40th Annual Convention, and with this the first national meeting of crushed stone producers since the highway construction program was so tremendously expanded by the 13-year Federal-Aid Highway Act of 1956, there will be great interest in the high level reports on what lies ahead for the crushed stone industry.

Producers, salesmen, and operating men will benefit from the message of A. C. Clark, Deputy Commissioner of the Bureau of Public Roads, as he brings first-hand information on "Quality Requirements for Materials To Be Used Under the New Highway Program." The problems of quality in aggregates is also a matter of importance in construction of projects other than highways, and A. T. Goldbeck, NCSA Engineering Consultant, talks on these problems along with new performance standards in his subject "Significance to the Stone Producer of Flexural Strength Specifications."

Of particular interest will be a talk on the new percentage depletion regulations and their application to the crushed stone industry by John F. Lane of Gall, Lane and Howe, General Counsel for NCSA. Donald B. Sherwood, Assistant General Manager, National Board of Fire Underwriters, and W. C. Rowe, Chairman of the NCSA Subrogation Committee, collaborate in telling of the progress that has been effected in the increasingly important field of subrogation.

Every delegate will reap personal rewards from the variety of subjects to be presented so capably by nationally known speakers. William H. Gove, Vice President of Sales, EMC Recordings Corpora-

tion, St. Paul, Minnesota, emphasizes this in "YOU Make the Difference." William Gill, Management Consultant, W. A. Gill and Associates, Alexandria, Virginia, also offers an opportunity for individual betterment in his talk on "Improving Management Skills." Walter G. Koch, President, International Steel Company, Evansville, Indiana, tells how "You Can Help End Tax Discrimination," while the "Significance of Recent Annual Elections—A Washington Preview of What Lies Ahead" is the subject of James W. Douthat, Assistant Vice President, Government Relations Division, National Association of Manufacturers, Washington, D. C.

Convention delegates will learn how their Association has functioned during the past year from the reports of J. R. Boyd, Executive Director, and J. E. Gray, Engineering Director. Another feature of the opening morning session will be the results of elections held by the new NCSA Board of Directors. Reports of the Auditing, Resolutions, and Accident Prevention Committees will also be presented, while four interesting color films shown during the Convention will add visual variety to the program.

In this category, an outstanding illustration of public relations is the film, scheduled for Wednesday morning, "Mountain to Main Street," which will be introduced by W. P. Foss, III, Chairman, NCSA Public Relations Committee. The common, yet important, problem of personal communications is brought sharply into focus in a most unusual film, "Production 5118," also to be shown on Wednesday morning. "Sea Chasers," a colorful production on acquiring marine life for the Miami Beach Seaquarium, to be shown Tuesday morning, is made particularly enjoyable by the narration of Herman Hickman; and everyone present will want to see "The Fourth Seacoast," the Thursday morning film showing the magnitude of the tremendous St. Lawrence Seaway engineering project.

### Timely Luncheon Programs

The two luncheons, too, will come in for their share of applause. At the Greeting Luncheon on Tuesday, Captain W. C. Mott, USN, Office of the Chairman, Joint Chiefs of Staff, Pentagon, Washington, D. C. tells an intensely fascinating story of the problems and difficulties involved in the constant adjustment of international relations. You will indeed have a ringside seat as you listen to Captain

Mott's timely message on "World Affairs—A Ringside Seat."

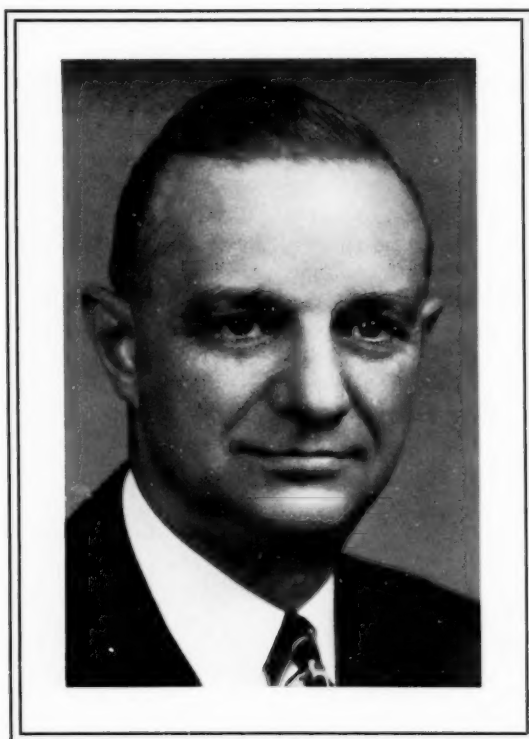
A traditional feature will be observed at the Greeting Luncheon on Tuesday when T. W. Jones of the NCSA Accident Prevention Committee gives well deserved recognition and presents awards to representatives of member company plants for achieving outstanding records in the annual NCSA Safety Contest.

The general Luncheon on Wednesday has a special attraction in the person of Arthur C. Horrocks, Public Relations Counsel, Goodyear Tire & Rubber Company, Akron, Ohio. With the Goodyear Company since 1917, Mr. Horrocks averages 125,000 miles in filling speaking engagements from coast to coast each year, and is admirably qualified for his subject as he tells you "And Greater Highways Than These You Will Travel."

### Special Session for Operating Men

A veritable "gold mine" of information awaits operating men and equipment manufacturers in the Special Operating Session of Thursday morning. Eight subjects, each carefully selected by a Committee of operating men will be capably presented by operating men. Time will be allowed for your questions and special emphasis given to solutions to your problems. The session will include subjects and speakers as follows: "Quarry Efficiency Standard Record Keeping" by T. C. Cooke, President, Lynn Sand & Stone Company, Swampscott, Massachusetts; "Measurement of Stone in Storage in Total and by Sizes" by Nelson Severinghaus, Vice President and General Manager, Consolidated Quarries Corporation, Decatur, Georgia; and "Advantages and Disadvantages of Scalping Between the Primary and Secondary Reduction Crushers"—E. Lee Heidenreich, Jr., Newburgh, New York. Maintaining quality in basic crushed stone operations is stressed by a 5-man panel on such important subjects as "Stripping for Quality"—John Bratton, Jr., General Manager, Superior Stone Company, Raleigh, North Carolina; "Crushing for Quality"—L. J. Burriss, Chief Engineer, Weston & Brooker Company, Columbia, South Carolina; "Screening for Quality"—M. Hankin, Jr., Executive Vice President, North Jersey Quarry Company, Morristown, New Jersey; "Rinsing and Washing for Quality"—John Cibula, Vice President in Charge of Operations, Bradford Hills Quarry, Inc., East Petersburg, Pennsylvania; and "Various

(Continued on Page 18)



**Russell Rarey**  
**1891-1956**

**H**IS host of friends throughout the National Crushed Stone Association will be deeply shocked and profoundly grieved to learn of the sudden and tragic death of Russell Rarey, who passed away on Monday, December 10, 1956, in Mount Carmel Hospital, Columbus, Ohio.

Ever conscientious in his devotion to the affairs of NCSA, Russ, as he was affectionately known among his colleagues in the Association, though not feeling up to par attended the midyear meeting of the Board of Directors at Lake Placid, New York, in July, and the meetings of the Nominating and Convention Arrangements Committees in New York during September. The first indication that he was in any serious physical

difficulty developed just prior to the meeting of the Executive Committee in Washington on November 27, 1956. Several days prior to this meeting Russ advised us that he could not attend as he was scheduled to immediately enter the Clinical Institute of the Philadelphia Hospital in Philadelphia for a complete and thorough checkup. He returned to Columbus for Thanksgiving intending to return to the Clinic for further tests immediately following. During the Thanksgiving weekend he suffered what was apparently a cerebral thrombosis, was taken to the Mount Carmel Hospital in Columbus, and on Friday, December 7, underwent brain surgery from which he never regained consciousness.

Russell Rarey first became identified with the



crushed stone industry in 1913, when he started to work for the Marble Cliff Quarries Company of Columbus, Ohio, as a shipping clerk. Shortly thereafter he was transferred to the Sales Department and in 1926 he was made Vice President in Charge of Sales. In 1934 he was made Vice President of the company and also was elected to membership on its Board of Directors. He was made President of the company on January 15, 1948, which position he retained until his death. In May of 1955 he was elected Chairman of the Board of Directors, to fill the vacancy left by the death of Harold J. Kaufman.

During the last few years his efforts for the Marble Cliff Quarries Company became intensified. Appreciating the importance of well thought out planning, he played a major part in the extensive modernization program of the company between the years of 1948 and 1950; and more recently devoted a great deal of time and effort to improving the company's stone resources, being very successful in purchasing land and having it rezoned for company use.

Russell Rarey served the National Crushed Stone Association with outstanding distinction over a span of nearly 30 years. He was first elected to the Board of Directors in 1927 and to the Executive Committee in 1932, serving in each capacity until the time of his death. He served as Regional Vice President for the Central Region in 1931 and 1932, and was chosen to serve as President for the years 1934 and 1935. His administration presented perhaps more outstanding difficulties than did that of any of the preceding presidents in that his was the difficult task of maintaining the autonomy, identity, and life of the Association when at the same time it was a part of a three-industry code authority.

In 1954 the By-Laws of the Association were changed to provide for the annual election by secret ballot by the Board of Directors of a past president to serve on the Executive Committee. The election of Russell Rarey, from the group of eligible past presidents, to serve on the Executive Committee in 1955 and 1956, clearly indicates the love, affection,

and high regard in which he was held by his fellow Board members.

In 1952 he was appointed Chairman of the National Crushed Stone Association's Percentage Depletion Committee and in such capacity undoubtedly rendered his outstanding service of recent years.

The funeral services were held on Wednesday, December 12, 1956, at 2:30 p.m., at the First Community Church, Columbus, Ohio, with interment in Union Cemetery at Columbus.

Dr. Roy Burkhart officiated and in conversational tone reminded us of the many salient qualities of character which had endeared Russ to all who had the privilege of knowing him. In conclusion, Dr. Burkhart read the following, penned by an unknown author, and we are sure that here is portrayed the man we knew and held in such affectionate regard—Russell Rarey.

"A real man never talks about what the world owes him, the happiness he deserves, the chance he ought to have, and all that. All that he claims is the right to live and play the man. A real man is just as honest, alone in the dark, in his own room, as he is in public. A real man does not want pulls, tips and favor. He wants work and honest wages. A real man is loyal to his friends and guards their reputation as his own. A real man is dependable. His simple word is as good as his Bible oath. A real man does not want something for nothing, so the 'get-rich quick' people cannot use him. A real man never hunts danger, and never dodges it when he ought to meet it. A real man is—well, he is an honest man, the finest, best, noblest, most refreshing thing to find on all the green earth."

Surviving are his wife, Mayme, of 2477 Brixton Road, Columbus, Ohio; three sons, Charles and John, both of Columbus, and Robert, of Birmingham, Michigan; a brother, Warren, of Groveport, Ohio; and five grandchildren.

# A Graphical Method of Combining Sizes of Aggregates for a Specification

By JAMES M. RICE

Research and Testing Engineer  
National Crushed Stone Association  
Washington, D. C.

**P**RODUCERS of crushed stone must supply aggregates which will meet specified gradation requirements. Often the stone as sized in the normal plant operations meets the gradation requirements. Frequently it is necessary that two or more sizes be combined to produce the desired gradation.

The problem of combining two sizes of aggregates to meet specification limits is quite simple, either graphically or arithmetically. Combining three aggregates is more difficult and it is the purpose of this article to describe a relatively simple graphical solution to the problem. Since the procedure for combining three sizes of aggregates is an extension of the method for two aggregates, the latter method will be outlined first.

## Combining Two Sizes of Aggregates

Suppose that two sizes of stone for concrete are to be combined to conform to a specified gradation. Let the gradation of the two sizes and the specification limits be as follows:

Sieve Size	Total Per Cent Passing		Specification Limits
	2 in.-1 in. Stone	1 in.-No. 4 Stone	
2 1/2 in.	100		100
2 in.	96	100	95-100
1 in.	11	96	35-70
1/2 in.	3	37	10-30
No. 4	0	7	0-5

The gradations of the 2 in. and 1 in. sizes are plotted on the left and right edges respectively of the chart shown in Figure 1. Cross-section paper with 10 lines per inch is convenient for this purpose. Like sieve sizes are connected by straight lines across the chart. The line for any given sieve size contains all possible percentages of that size for combinations of the 2 in. and 1 in. stone. The horizontal scales show, at the top, the percentage of 2 in. stone

in a combination; and, at the bottom, the percentage of 1 in. stone. The specification limits are indicated by hash marks on the lines connecting like sieve sizes. The portions of the lines within the limits are also shown by heavy lines. The range of acceptable combinations is governed by the minimum horizontal distance between upper and lower specification limits. This range is shown by the vertical dashed lines drawn through the intersections of the 35 and 70 per cent passing limits with the 1 in. size line. These vertical lines show that the percentage of 2 in. stone in the combination must be between 31 and 72 per cent. All combinations within this range would meet the specification requirements.

Any vertical line also shows the entire gradation of the combination represented by that line. For example, the combination of 50 per cent 2 in. and

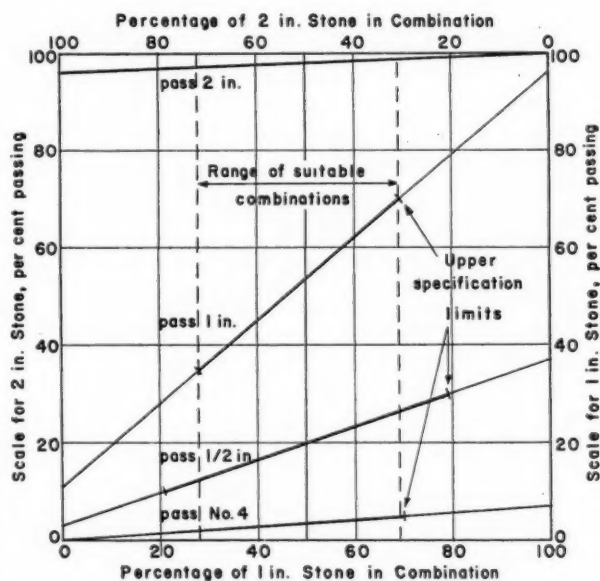


FIGURE 1  
Chart for Combining Two Sizes of Aggregates

50 per cent 1 in. stone would have the following gradation:

Sieve Size	Per Cent Passing	Specification Limits
2 1/2 in.	100	100
2 in.	98	95-100
1 in.	54	35-70
1/2 in.	20	10-30
No. 4	3	0-5

### Combining Three Sizes of Aggregates

To combine three aggregates, a two-part chart is used as illustrated in Figure 2. Each half of this chart is similar to the diagram shown previously in Figure 1. To illustrate the use of the two-part chart, assume that three sizes of stone are to be combined to make a bituminous binder course aggregate. The gradations of the three materials and the specification limits are as follows:

Sieve Size	Total Per Cent Passing			Specification Limits
	Fine Stone	Intermediate Stone	Coarse Stone	
1 1/2 in.			100	100
1 in.		100	95	90-100
1/2 in.	100	95	8	40-70
No. 4	98	10	2	25-45
No. 10	70	3		15-30
No. 40	30			5-15
No. 200	12			2-6

**Step 1.** The gradations of the above aggregates are marked on the left, center, and right vertical axes of the two-part combining chart as shown. Like sieve sizes are connected by straight lines across the chart to the adjoining axes, but *only for the left part of chart—for fine and intermediate sizes*. This side of chart will be used to select the proportions of the combined fine and intermediate sizes (Combination A). Before making this selection it is necessary to study the other half of the chart.

**Step 2.** The purpose of this examination is to determine the approximate percentage of the coarse stone in the final combination B. Note that practically all of the plus 1/2 in. size will have to be provided by the coarse stone since all of the fine size and most of the intermediate size are finer than 1/2 in. With a light line, connect the passing 1/2 in. marks on center and right axes. This line has a relatively steep slope and therefore is critical since the amount of passing 1/2 in. size will vary considerably with changes in proportions. Mark on this line the specification limits for passing 1/2 in.; that is, hash marks at intersections with 40 and 70 per cent passing. These marks show that the range for the amount of coarse stone in the final combination B will be approximately 29 to 63 per cent. As a trial, select a mid-point percentage of 46 per cent which would provide about 55 per cent passing 1/2 in. in

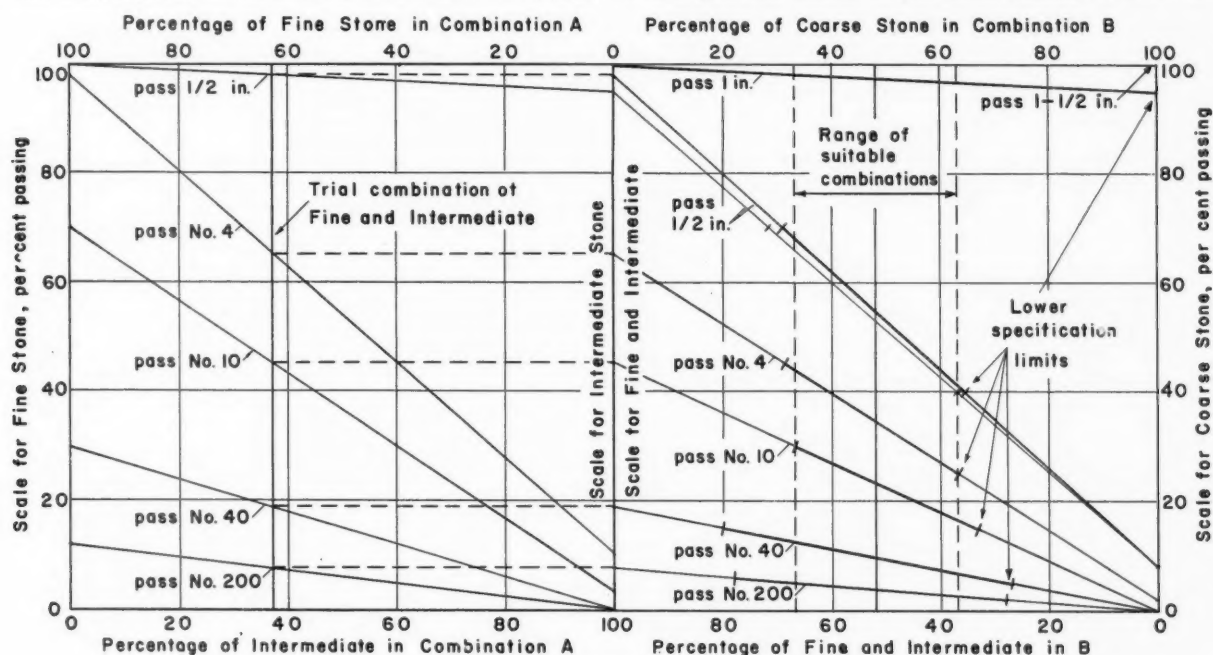


FIGURE 2  
Two-Part Chart for Combining Three Sizes of Aggregates

final combination. The remaining 54 per cent will consist of combined fine and intermediate sizes.

**Step 3.** The next step is to determine a trial percentage for the combined fine and intermediate sizes in the left part of chart. Again, concentrate on the steep-sloped lines, in this case the passing No. 4 size. The specifications require 25 to 45 per cent passing No. 4, most of which will be supplied by the fine size. The mid-point value for the range of 25 to 45 per cent passing No. 4 is 35 per cent. This value is based on the total aggregate. The corresponding percentage of passing No. 4 in the fine-intermediate combination A is, of course, much greater. The percentage of combined fine and intermediate sizes has been tentatively selected as 54 per cent of the total in Step 2. Therefore, the passing No. 4 in the fine-intermediate combination equals 35 divided by 0.54, or 65 per cent. For the fine-intermediate combination A in the left part of the chart, the 65 per cent line intersects the passing No. 4 line at 63 per cent fine size and 37 per cent intermediate size. Erect a vertical line at this position as shown in Figure 2.

**Step 4.** The intersections of the vertical line at the combination of 63 per cent fine-37 per cent intermediate with the sieve size lines are then transposed horizontally to the center axis. This axis now becomes the gradation of the selected combination of fine and intermediate sizes. The points on this axis are then connected with similar sieve sizes on the right axis (coarse stone), and the specification limits are marked on each sieve line. As explained previously, the range of acceptable combinations is limited by the minimum horizontal distance between upper and lower specification limits. This range, shown by dashed vertical lines, indicates that the amount of coarse stone in the final combination B may vary from 33 to 63 per cent when used with the selected combination of fine and intermediate sizes. A final selection might be made at 48 per cent coarse stone. A vertical line erected at 48 per cent provides the complete gradation of this combination which is:

Sieve Size	Per Cent Passing	Specifications Limits
1 1/2 in.	100	100
1 in.	98	90-100
1/2 in.	55	40-70
No. 4	35	25-45
No. 10	23	15-30
No. 40	10	5-15
No. 200	4	2-6

The proportions of the three materials in this final combination would be calculated as follows:

Coarse Stone (from chart)	= 48 per cent
Intermediate Stone 0.52 x 37	= 19 per cent
Fine Stone 0.52 x 63	= 33 per cent
	100 per cent

**Step 5.** It is possible that the method described above will not provide the best gradation. For instance, the final gradation may be so close to the limits on one or more sieves that slight variations in grading of components or in proportioning may make the material unacceptable. If such is the case, an improvement may be made by adjusting the proportions of the fine and intermediate sizes on the left part of chart. Erect another vertical line at an appropriate point, project the intersections to the center axis, and complete the right section of chart as described in Step 4. The use of a colored pencil is helpful to distinguish the new lines from the previous ones.

With a little practice the user will find this procedure for blending three aggregates to be quite simple and rapid. The method will be found advantageous in that it facilitates the selection of the least critical combination of materials for required gradation limits. The method is similar in some respects to the procedure devised by Charles F. Parker of the W. H. Hinman Company (Blue Rock Quarry). The reader who is interested in Mr. Parker's method and other graphical methods for combining aggregates will find the following references helpful:

Parker, C. F., "Paving Road to the Summit of Mount Equinox," *Proceedings, Association of Asphalt Paving Technologists*, Vol. 23, p. 446 (1954).

"Principles of Highway Construction as Applied to Airports, Flight Strips, and Other Landing Areas for Aircraft," *Public Roads Administration*, p. 143, 184 (1943).

### Traffic Deaths Drop 12 per cent

**A**FTER 19 consecutive months of increases, traffic deaths dropped an amazing 12 per cent in October, compared with the same month last year, the National Safety Council reports. October is the latest month for which information is available.

The decrease also reversed the normal seasonal trend. Usually, deaths in October are higher than in any preceding month. The October total of 3,450 was the lowest since June, and was an estimated 800 fewer than a normal statistical projection would have predicted.



## B. D. Tallamy to be Federal Highway Administrator Expected to Take Office in January

**B**ERTRAM D. TALLAMY, Chairman of the New York State Thruway Authority since its beginning in 1950, has been selected by President Eisenhower to be the first Federal Highway Administrator. Mr. Tallamy is expected to assume his new duties after the first of January 1957. His nomination is subject to confirmation by the U. S. Senate.



BERTRAM D. TALLAMY

John A. Volpe, recently resigned Commissioner of Public Works for Massachusetts, accepted an interim appointment by the President and is serving as Acting Federal Highway Administrator until Mr. Tallamy takes office.

Creation of the new position, which carries with it sub-cabinet rank in the U. S. Department of Commerce, stemmed from passage of the Federal-Aid Highway Act of 1956. The legislation was signed into law by the President on August 3, 1956.

As Federal Highway Administrator, Mr. Tallamy will be vested with the responsibilities as top advisor on federal highway policy and will also be in direct administrative charge of the greatly expanded 13-year interstate road construction program. C. D. Curtiss, Commissioner of Public Roads, will administer the expanded primary, secondary, and urban federal-aid road programs, and continue in charge of the research and technical work of the Bureau of Public Roads.

### Weeks Praises Appointment

Secretary of Commerce Sinclair Weeks, under whom the Federal Highway Administrator will serve, warmly praised the appointment of Mr. Tallamy, saying in part:

"Because of the magnitude of the new national highway program, and the tremendous

contribution it will make to safe, swift, and convenient motor transportation, economic growth, and national defense, a nationwide search was made for the expert best qualified to handle this all time record road program. Advice was sought from authorities in highway, transportation, public works, and related fields.

Mr. Tallamy is far famed for engineering know-how and business executive competence. He will have direct responsibility for the administration of the Bureau of Public Roads and the new national highway program. This assures the nation that history's biggest public works project, involving many billions of dollars, will be constructed with outstanding skill, speed, vision, and integrity."

### Mr. Tallamy's Record

Early in his professional career, Mr. Tallamy was established in the construction field, and by 1940, had served as a partner in two well known engineering firms specializing in municipal water systems, dams, sewage treatment plants, subdivisions, housing, highway and street construction, and general municipal engineering. While a member of the firm of Sheehan, Fratts and Tallamy, he became Deputy Chief Engineer of the Niagara Frontier Planning Board in 1935, and was made Chief Engineer in 1937.

While with the Planning Board, Mr. Tallamy was responsible for planning the Buffalo to Niagara Falls section of the New York State Thruway System now under construction, and an Expressway from Buffalo through the City of Lackawanna, now a part of the State Arterial Route System.

Mr. Tallamy left his private engineering firm and the Niagara Frontier Planning Board in January 1945 to accept the position of Deputy Superintendent of Public Works of the State of New York. As Deputy Superintendent, he coordinated the state's multi-million-dollar post war construction program; sponsored creation of the Bureau of Arterial Route Planning, and established the basic principles and personally guided the development of the state arterial route plans for almost one-half the cities in the State of New York. He also handled the state's



first analysis of highway conditions and future needs which formed the basis for a 10-year, \$2,800,000,000 highway program sponsored by the State Public Works Department.

Appointed Chief Engineer of the New York Public Works Department in July 1947, Mr. Tallamy's first project was a review of the standards of design for all expressways. On October 1, 1948, Governor Thomas E. Dewey appointed Mr. Tallamy as Superintendent of Public Works and he served in this capacity until December 31, 1954.

In 1950, Mr. Tallamy was named as one of three members to the new State Thruway Authority. He was further designated as Chairman for a term scheduled to last until January 1, 1960.

In the period when Mr. Tallamy was Superintendent of Public Works, he also served as New York State Fuel Administrator during the critical soft coal shortages of 1949-50, as Secretary of the State's Flood Control Commission, member of the Water Pollution Control Board, member of the Water Power and Control Commission, member of the New York State Civil Defense Commission, member of the Board of Commissions, Land Office, Department of State, member of the Temporary Highway Finance Planning Commission, and Chairman of the Emergency Housing Joint Board.

The over-all construction program reached a high of \$928,500,000 in 1954. Of that amount, Mr. Tallamy administered \$475,000,000 in Thruway work, \$282,000,000 for highways, parkways, arterials, and grade-crossing eliminations, \$165,000,000 in building and ground projects, and \$6,500,000 in beach protection, flood control, and canal work.

Since 1954, an additional \$511,000,000 of Thruway construction has been advanced under his general direction as Chairman of the Thruway Authority.

The Thruway Authority was created as a result of a plan by Mr. Tallamy to finance the huge Cross-State Thruway through creation of a public authority to construct the entire expressway system. The over-all plan of the Thruway Authority was to complete the super highway in the shortest possible time. As Chief Executive of the new agency, Mr. Tallamy executed the tremendous task of organizing the Thruway staff for the preparation of plans, administration, and actual construction work.

Elected a member of the Executive Committee of the American Association of State Highway Officials in 1948, Mr. Tallamy was named First Vice President in 1950 and became President in 1951.

In addition to serving as a member of the International St. Louis River Control Board, Mr. Tallamy is a member of the American Society of Civil Engineers, Albany Society of Engineers, New York Association of Highway Engineers (honorary), the Society of American Military Engineers, the National Society of Professional Engineers, and the national honor societies of Tau Beta Pi and Chi Epsilon. He received a citation in engineering from the University of Buffalo and the New York State Society of Professional Engineers. He is a member of the Fort Orange Club and the University Club of Albany, New York.

A native of Plainfield, New Jersey, Mr. Tallamy graduated from the Plainfield High School and from Rensselaer Polytechnic Institute as a civil engineer. He is married and has one son. His home is on Taborton Road, Sand Lake, New York.

Those in attendance at the 36th Annual Convention of NCSA, Hotel New Yorker, New York City, 1953, will recall the wealth of information Mr. Tallamy so expertly brought to his audience when he spoke on "The Trend Towards Throughway Construction".

The National Crushed Stone Association is pleased to extend congratulations and best wishes to Mr. Tallamy on his selection as Federal Highway Administrator.

### New Research Program

A Maryland Joint Highway Research Program has been set up by the Maryland State Roads Commission and the University of Maryland. Dean S. S. Steinberg of the University's College of Engineering will direct the program. Purpose will be to conduct research into all phases of highways, including planning, design, construction, traffic and maintenance.

Advisory Council members are: Jesse E. Buchanan, Director of The Asphalt Institute; Fred Burggraf, Director of the Highway Research Board, Charles D. Curtiss, Commissioner of the U. S. Bureau of Public Roads; Albert T. Goldbeck, recently retired Engineering Director of the National Crushed Stone Association and now engineering consultant to the association; G. Donald Kennedy, President of the Portland Cement Association; and Stanton Walker, Director of Engineering of the National Sand and Gravel Association.

# Lessons Learned From Minor Injury Accidents in the Cement and Quarry Industry<sup>1</sup>

By J. R. D. BROWN

Assistant Manager  
Accident Prevention Bureau  
Portland Cement Association  
Chicago, Illinois

**I**T MAY appear paradoxical that the cement and quarry industries, which rank with other heavy industries having the highest average number of days charged per disability, should be concerned with minor injuries as a result of which no days are lost or charged at all. Our interest in minor injuries is genuine. It springs from the conviction that through the study of minor injury accidents, substantial progress can be made in preventing disabling and even fatal mishaps.

The subject of this paper was assigned several months ago. It soon became apparent, however, that the topic should be amended to "LESSONS TO BE LEARNED FROM MINOR INJURY ACCIDENTS."

Certainly, a number of PCA member company plants have been actively interested for several years in the field of minor injury studies. Their activities indicate that they have learned many valuable lessons from their researches and have solved countless plant safety problems. But the industry as a whole has not yet become fully aware of the benefits obtainable through this approach.

J. E. Trainer, Executive Vice President, Firestone Tire and Rubber Company, Akron, recently expressed in these words the point of view of industry leaders who are turning increasing attention to this aspect of safety work: "Progress in accident prevention is becoming more and more difficult. Years ago, there was so much to be done, attention was given to the most obvious sources of injury. But as they were corrected, it became necessary to look more closely to final evidences of inefficiency and accidents, and particularly to sources of dangerous accidents. We must find new and ingenious techniques if we are to continue to improve our safety records. By reducing minor injuries, we will prevent many a serious one."

The prospect of important benefits to safety work generally, as well as for other reasons to which ref-

erence will be made momentarily, encouraged the PCA to expand its injury reporting system.

Preliminary study leaves little doubt that much the same accident causes are involved in non-disabling and disabling injuries and fatalities. Non-disabling injuries appear to be symptomatic of the same deficiencies in men, methods, and equipment that lead to disabling injuries. On this premise, it was determined to obtain a more complete picture of cement plant accident experience by systematically collecting and analyzing non-disabling injury data.

Need for such a broadened base on which to evaluate the plant safety situation has come in part from the decline of more than 90 per cent in the member company disabling injury frequency rate over the past 25 years. Last year more than 40 per cent of the member company plants reported no disabling injuries or fatalities and another 25 per cent sustained just one chargeable disability.

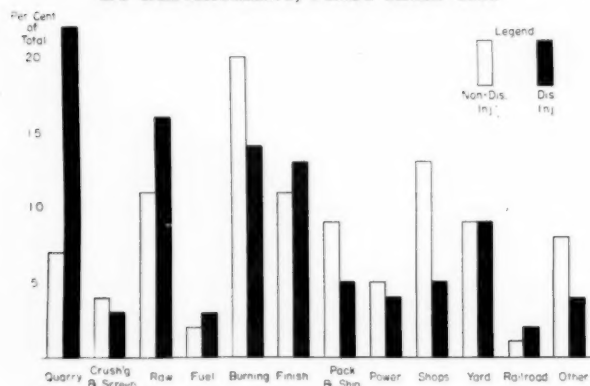
## Combat Complacency

When organizations function for long periods of time without anyone suffering a serious injury, feelings of complacency and lack of awareness that serious injuries can occur tend to replace an ever-watchful concern. When accidents are not occurring in any large numbers, employees are inclined to forget that they can occur. For these reasons, the good safety record has in it some of the elements of a poor safety record. No plant team having a good safety record can afford to rest on its laurels any more than a driver can afford to relax vigilance against traffic dangers. Certainly, it is not enough to "just hold the line" safetywise. The stimulus to safety effort that comes from analyzing non-disabling injuries is beneficial in combating self-satisfaction and any tendency to relax or coast on a record.

Occasionally, a plant team is shocked to its senses and to renewed safety effort by a fatality which terminates a relatively long period of operation

<sup>1</sup> Presented before the Cement and Quarry Section, National Safety Congress, Chicago, Illinois, October 24, 1956

### PCA NON-DISABLING AND DISABLING INJURIES BY DEPARTMENT, FIRST HALF 1956



without any disabling injuries. In the past five years, 17 fatalities have occurred in PCA member company plants which reported no other chargeable injury in the course of the year in which the fatality took place. There is little doubt but that the accident which took each of these lives was but one of many mishaps which had occurred in the respective plants. Only the other accidents had resulted in no or less serious personal injury.

### Study Minor Injuries

Finally, the expanded reporting program was undertaken with the hope that it would promote wider and better understanding of the benefits of minor injury studies in all plants. The application of findings and techniques will be encouraged, so that safety work generally may benefit.

Despite a desire to undertake this project in a thorough-going way, we were not in a position to handle the administrative detail involved in setting up a reporting and analysis procedure for non-disabling injuries comparable to that used in the study of disabling and fatal injuries. It was necessary, therefore, to develop a simple, basic reporting method that would be generally beneficial to the individual operating plants and to the industry as a whole.

Reporters were invited to submit monthly summary tabulations of their non-disabling accident cases, i.e., those requiring first-aid treatment or medical care, but involving no loss of time from work or permanent disability as defined in ASA Code Z16.1 (1954). It was made clear that their reports would not prejudice plant standings in the

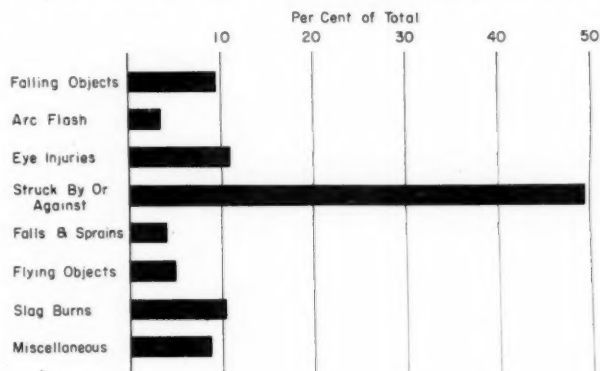
PCA safety trophy competition, which is based solely on disabling injury experience. A two-sided report form was prepared and distributed, one side correlating *unsafe acts and unsafe conditions* with *type of accident*; and the other side correlating *accident agency* with the *departments* in which the injuries occurred.

Returns from approximately 100 member company operating units showed that an average of 23 non-disabling injuries have been occurring monthly in each plant, with a range from none in 12 plants for one or more months to a maximum of 152 reported for one month by a plant which has a monthly average of 130 cases. It is of more than passing interest to note that active members of the exclusive Thousand-Day Club, i.e., those plants with untermiated records of more than 1,000 consecutive days without a disabling injury, have reported an average of more than 25 non-disabling injuries per month.

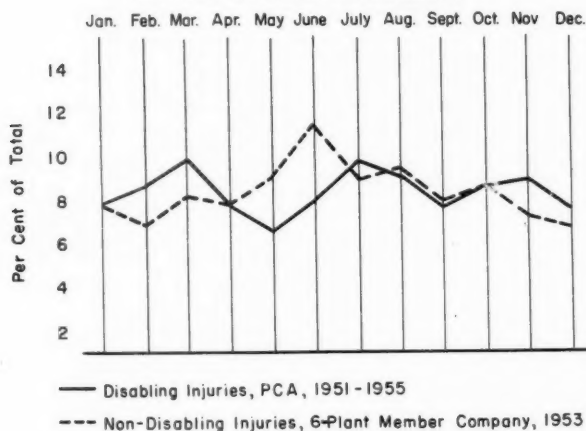
Our experience thus far with non-disabling injury reporting raises serious doubt as to the understanding among the plant teams as to the definition of a "non-disabling injury." The data in a number of instances apparently represent only medical cases resulting in no loss of time. There is reason to believe that some organizations may not have well-developed procedures to assure that employees promptly seek first-aid treatment for minor injuries.

Unfortunately, there is little agreement as to a proper definition of a "minor" injury. Dr. W. D. McCunniff, writing in the *National Safety News* for February 1956 says: "It's a little hard to define a minor accident. A good definition is that a minor accident is one that happens to someone else. To

### TYPES OF NON-DISABLING INJURIES OF MAINTENANCE PERSONNEL IN A MEMBER PLANT IN 1955



## MONTHLY INJURY PATTERN



the man that has it, any accident is a major accident."

## Emphasize Prompt Treatment

More important than verbalizing over the definition of minor injuries is the matter of obtaining *prompt attention* for such injuries as do occur. Last year 12 member company workers who sustained minor injuries and did not get prompt first-aid treatment, later lost an average of three weeks time because of complications.

Infection is rare among injuries given immediate medical or first-aid attention. According to one study, each day of delay in reporting for medical attention resulted in an increased proportion of infections. Forty per cent of all injuries which were first reported five or more days after injury developed infections. The dubious alibis frequently offered to excuse failure to obtain prompt first-aid treatment reflect need for intensive promotional effort to improve understanding and perhaps for additional and more conveniently located first-aid stations.

One plant reports that supervision has substantially reduced cases involving infection by:

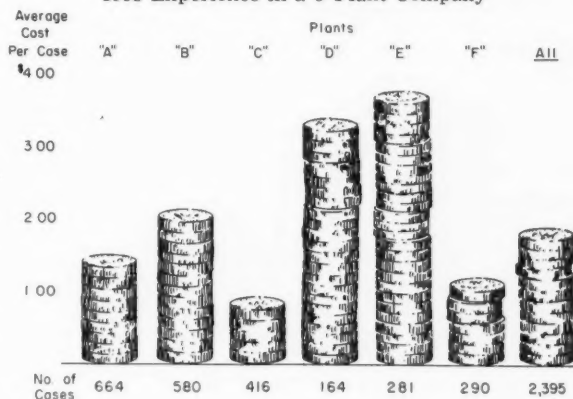
1. Explaining to employees why prompt first-aid is important
2. Making sure that every employee is familiar with the proper procedure in reporting minor injuries and in getting first-aid treatment
3. Watching for home-made bandages, irritated eyes, attempts to remove foreign objects from one another's eyes, or using a knife to remove splinters from hands

Another multi-plant reporter comments: "We insist that employees report for first-aid in case of any injury, no matter how small—even including nicks, scratches, and minor bruises. We do not refer to these as "reportable" accidents because we feel that employees might hesitate to have minor hurts attended to if they felt they would go into the records as accidents. We want them to feel easy about reporting for first-aid. Records of all first-aid cases are kept at the plant."

## Investigate

In the well-administered safety program, *every* minor injury receives *prompt* first-aid or medical care, as required. Attention is then directed to the seriousness of the mishap that produced the injury to determine whether full investigation of the accident is warranted. If a minor injury involves a potentially serious unsafe act or unsafe condition, then a thorough, full-dress investigation should be made. It is the *seriousness of the accident* and *not the injury* that should determine investigative procedure.

The line between a so-called minor injury accident and a fatality is very fine, drawn quite often, though not always, by factors over which personnel may have little or no control. It should be pointed out, however, that in heavy industries such as ours where the injury severity rate tends to be excessive, there is much that can be done through job safety analyses, job methods improvement, and mechanical guarding to make safe the potential sources of severest injury. In our industry, these have been identified and characterized for years as "The Four Horsemen," namely, Moving Machinery, Electricity,

MINOR INJURY ACCIDENT COSTS  
1953 Experience in a 6-Plant Company



High Places (including falls of men and falling materials), and Haulage (including railroad and trucking hazards). Minor injury accidents involving these factors should be subject to most careful investigation and follow-up procedures to prevent recurrence. Two examples will illustrate:

A cement plant repairman, age 45, with three years experience at his present job title, was cleaning off built-up shale from a belt pulley while it was in motion, using a short iron bar. In so doing, his hand got caught between the belt and the pulley with the result that he sustained multiple bruises and abrasions to the right side of his hand and a fractured little finger. The victim was extremely fortunate in being able to resume his duties with only the loss of the time required to obtain medical attention.

Two weeks later, at another plant, a kiln feed assistant, age 39, employed 2½ years, lost his life while trying to clean slurry from a belt conveyor with a brick hammer. The hammer caught between the belt and pulley, drawing the victim's left arm into the pinchpoint where it was severed at the elbow. His chest was crushed and internal injuries brought sudden death.

These two instances suggest an important use for non-disabling injury accident cases involving the sources of severest injuries. Because of the capriciousness of injury severity, such mishaps should be exploited to the fullest in securing employee compliance with key safe operating rules and practices. When a man has lost his life through failure to observe a key safe operating rule, such as wearing a properly adjusted life belt and line while working in a tank or cement silo, there is nothing to be gained with respect to the victim in terms of proceeding with a view to securing future compliance. But if the violator of a key safe operating rule is fortunate enough to escape with a minor injury, both he and his supervisors are in a position to profit by efforts to assure future compliance.

One more observation should be made on the topic of minor injury accident investigation. It is one of the most valuable tools in the kits of the safety man and the supervisor. An increasing number of organizations find this to be true and are investigating every minor injury accident. They are taking indicated measures to eliminate possibility of recurrence and the chance of a severe or even fatal injury. D. P. Cochran, safety superintendent at the U. S. Naval Air Station, Pensacola, has stated this point of view very well: "It is a false generalization to say

that only accidents causing disabling injuries should be investigated. Most accidents are potentially serious. First-aid cases as well as those causing death or serious injury should be investigated. The payoff for all your efforts comes when an unsafe practice or method is involved and a serious injury at some subsequent time is prevented."

### Analyze Patterns and Significant Groupings

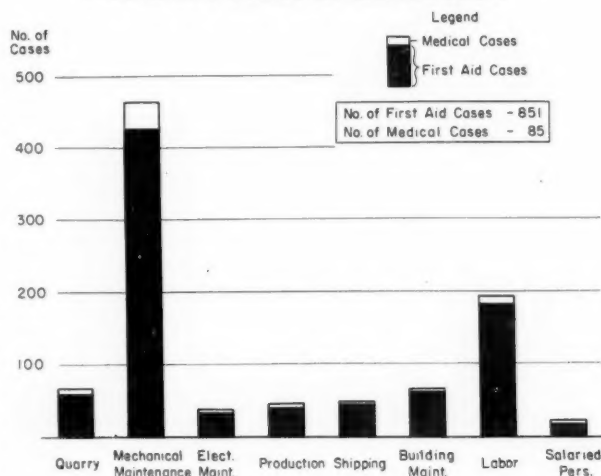
Many minor injury accidents, occurring as single, isolated events, do not seem important in themselves. But as these widely scattered instances, separated in both space and time, are recorded, grouped, and analyzed, they may take on new significance. The non-disabling injury data which the PCA is developing will probably have most value in this way—in that patterns and significant groupings may emerge which will suggest areas and problems that can benefit from further attention at the plant level.

We have made two tabulations of the more than 13,000 non-disabling injuries reported to us for the first six months of 1956, on the forms previously mentioned. We must acknowledge that there is much in the picture that we do not understand. But at this early stage, it seems we may profitably ask some questions of the reporting plants which may guide their future thinking and investigation.

As we look at the correlation of accident cause and accident type, questions such as these come to mind:

1. Why is the proportion of men hurt by striking against objects so great? Unsafe movement and

1955 NON-DISABLING INJURIES IN A MEMBER COMPANY PLANT BY DEPARTMENT





*faulty job performances* are big contributors, followed by *unsafe personal dress*. Why?

2. *Faulty job performance* and *unsafe position taken* are main contributors to men getting caught between objects. What are the remedies?
3. Should the use of *eye protection* be universal throughout the plant, as is increasingly the case with toe and head protection?

On the reverse side of the form, approximately the same cases were correlated between *agency* and *department where the accident occurred*.

4. Use of hand tools is understandably responsible for most non-disabling injuries, but why should this experience be worse in the *burning* department than in the *shops* or anywhere else? Are maintenance personnel less skilled, or is this situation a symptom of too many emergency repair jobs, reflecting lack of adequate preventive maintenance programs?
5. Protection against *raw materials* and *dust* needs most attention in the *burning* department. Should a start be made here on an eye protection program, then extended to *raw*, *yard*, and *finish* departments in that order?

In these and similar analyses of minor injury cases will be found suggestive leads for evaluating plant experience and comparing it with that of the industry as a whole.

### Establish Safety Features

Several interesting safety features found in member company plants attest to the fact that lessons can be learned from the study of minor injury accidents. In one organization, investigation of every minor injury takes an extremely practical turn, as is evident in the case of an electrician hurt while working on the magnetic coupling of a boiler fan. The fan motor had been locked out. Nevertheless the fan began rotating due to the natural draft in the stack after work had started on the magnetic drum. It was this unexpected turning of the fan that caused the mechanism being repaired to turn, resulting in the partial traumatic amputation of the victim's nail and laceration of the left third finger. Following a detailed statement of what happened, the printed report form poses this question. "What suggestions are offered to prevent a similar injury?" The completed report gives two specific suggestions in detail. The next question is "Who will be responsible to carry out the recommendations?" The re-

port names two persons with their specific assignments.

Another member company plant conducted an intensive hand protection campaign for several weeks based upon studies of minor injuries to hands and fingers. The plant management advises that plant sales of gloves increased nearly 10 per cent during the latter part of and remained at that level after the campaign. The percentage of hand and finger injuries dropped from 57 per cent of the total minor injuries to 39 per cent of the total for the first seven months of 1956. Our reporter made this observation: "We believe that efforts such as this Hand Protection Program are helpful, but they must be followed up to retain a major portion of the ground gained in the concentrated drive."

In another multi-plant organization, studies of disabling and non-disabling injuries to the head, eyes, and toes led to the adoption of a well-integrated personal protective equipment program. In six of this company's plants, 100 per cent of the personnel now wear hard hats, hard-toe shoes, and eye protection at all times on the plant premises. Several other units of the company are approaching the 100 per cent figure.

These examples are typical "lessons learned" from the study of minor injuries. One point, however, should be emphasized here. These plant groups went beyond the collection and analysis of reams of data. After carefully interpreting their information, they took appropriate action to solve the problems which their research had pinpointed. As the eminent historian, Mary Beard, has said, "Study without action is futile. Action without study is fatal."

We are hopeful that the safety thinking and planning of every member company organization will be benefited to the point where it will move to take similar constructive action in solving its safety problems. If the PCA program of non-disabling injury reporting helps promote acceptance of the principles we have outlined and gives encouragement to those who are developing their own programs, our efforts will have been worthwhile.

There is no set of pat answers to many of the safety problems that arise. Solutions must be finally determined on the basis of the best available information. Certainly, there is reason to believe that minor injury studies will become increasingly valued in formulating well-considered safety program features. Let's take seriously what minor injuries have to teach us and learn our lessons well.

## Miami Beach Convention

(Continued from Page 5)

Methods of Stockpiling and Reclaiming to Maintain Quality"—John Kawaske, General Superintendent, Callanan Road Improvement Company, South Bethlehem, New York.

## Manufacturers Annual Business Meeting

Members of the Manufacturers Division of NCSA will find their Annual Luncheon on Thursday one of the high spots of the Convention. Restricted to Division members, officers and members of the Board of Directors will be elected for the coming year at the Business Meeting following the Luncheon.

## Social Features

The social side of this meeting promises to be among the best in our history. The NCSA Fiesta on Tuesday evening is slated to be held under the stars in the tropical atmosphere of the beautiful Starlite Patio. There will be dinner, dancing, and a program of entertainment unusual in talent and scenery.

The Reception and Annual Banquet on Thursday evening provide a fitting climax to the Convention. With this the last opportunity for industry members to gather until a year hence, the emphasis will be on entertainment—and Jimmy Swan, an English-born, American-educated veteran of many years in vaudeville and radio as well as of the platform stage, will provide plenty of hilarious entertainment as he tells of "My Experiences . . . or I Should Have Stood in Bed."

## Special Program for the Ladies

As always, the ladies will be most welcome, and there will be much of interest for them at this Convention. In addition to the two program luncheons and the Annual Banquet which they have always found appealing, a special ladies program of entertainment is planned. Headquarters for ladies' activities will be the Eastward Room, located on the second floor of the Americana, and in addition to a Ladies Tea held there on Monday, coffee will be served daily from 9:30 to 11:00 each morning during the Convention. Also planned is a trip by boat around picturesque Biscayne Bay and a visit to the

underwater entertainment of the Seaquarium. The many smart shops of Lincoln Road and Miami will also prove attractive.

## Time for Relaxation and Fun

In addition to the time you allow yourself before and after the Convention to see and enjoy Miami Beach and Florida, two of the three Convention afternoons and one evening have been left open for your individual plans. There is much to see and do in the Miami Beach area—sightseeing by land or sea, golf, tennis, fishing, horse and greyhound racing, and for those who have never before seen it—the Basque game of jai-alai—a fast and dangerous game of top entertainment which is played nightly at the Miami Fronton. Everything is within easy driving distance, and of course, there is swimming—in the Atlantic surf right in front of your hotel, or in the private hotel pool. Attractive 3-day post-Convention trips to either Havana or Nassau can be taken by air on Friday, January 18.

## A Cordial Invitation to You

The foregoing has been a quick preview of the many benefits and pleasures in store for you at the 40th Annual Convention of NCSA. Please consider this a cordial invitation to attend—everyone will be welcome. There is no Convention registration fee for producers of crushed stone or for members of the Manufacturers Division.

Start 1957 off right—plan now to be with your fellow producers at the Americana Hotel in the Bal Harbour Area of Miami Beach on January 15, 16, and 17, and share in the outstanding event of the year for the crushed stone industry.

## BPR to Conduct Study on Highway Safety

SECRETARY of Commerce Sinclair Weeks has announced the beginning of a two-year study on highway safety, and Federal Highway Administrator John A. Volpe appointed Charles W. Prisk of the Bureau of Public Roads to direct the study. Subjects the study will deal with are the need for Federal assistance to state and local governments in the enforcement of necessary highway safety and speed requirements; the advisability and practicability of uniform state and local highway safety and speed laws, and what steps the Federal Government should take to promote the adoption of such laws.

## Manufacturers Division National Crushed Stone Association

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These associate members are morally and financially aiding the Association in its efforts to protect and advance the interests of the crushed stone industry. Please give them favorable consideration whenever possible.

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**Allis-Chalmers Mfg. Co.**

Milwaukee 1, Wis.

*Crushing, Screening, Washing, Grinding, Cement Machinery; Motors; Texrope Drives; Centrifugal Pumps; Air Compressors; Hauling Equipment; Engines; Tractors*

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*Power Shovels, Draglines, Cranes, Bins, Conveyors and Idlers, Crushers and Pulverizers, Feeders, Plants—Crushing and Portable, Washing Equipment, Asphalt Plants, Dust Control Equipment, Roadpacker*

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*Conveyor, Elevator, and Transmission Belts, V-Belts; Sand Blast, Water, Steam, Air, Suction Hoses*

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**Bucyrus-Erie Co.**

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## Manufacturers Division – National Crushed Stone Association

(continued)

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Track-Type Tractors, Bulldozers, Earthmoving Scrapers, Motor Graders, Heavy-Duty Off-Road Hauling Units, Diesel Engines, Diesel Electric Generating Sets, Front End Shovels, Wheel-Type Tractors

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### Deister Machine Co.

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### Detroit Diesel Engine Division

#### General Motors Corp.

13400 West Outer Drive, Detroit 28, Mich.

Light Weight, Compact 2 Cycle Diesel Engines; Electric Generator Sets

### Diamond Iron Works

#### Division Goodman Manufacturing Co.

Halsted Street & 48th Place, Chicago 9, Ill.

Jaw and Roll Crushers; Vibrator, Revolving, and Scrubber Screens; Drag Washers; Bucket Elevators; Belt Conveyors; Bins; Apron and Plate Feeders; Portable Gravel and Rock Crushing, Screening, and Washing Plants; Stationary Crushing, Screening, and Washing Plants; Hammermills

### Drill Carrier Corp.

1701 Shenandoah Ave., N. W., Roanoke, Va.

"Air-Trac" Drill Carrier

### Du Pont, E. I., de Nemours & Co.

Wilmington 98, Del.

Explosives and Blasting Supplies

### Dustex Corp.

1758 Walden Ave., Buffalo 25, N. Y.

Dust Collecting Equipment; Dust Control Systems; Feeders

### Eagle Crusher Co., Inc.

900 Harding Way East, Galion, Ohio

Crushers, Pulverizers, Hammermills, 4-cage Disintegrating Mills

### Eagle Iron Works

129 Holcomb Ave., Des Moines 13, Iowa

Fine Material Screw Washers—Classifiers—Dehydrators; Coarse Material Screw and Log Washers—Dewaterers; Water Scalping and Fine Material Settling Tanks; Drop Balls—Ni-Hard and Semi-Steel; "Swintek" Screen Chain Cutter Dredging Ladders; Revolving Cutter Head Dredging Ladders

### Easton Car & Construction Co.

Easton, Pa.

Off-Highway Transportation: Dump Trailers, Truck Bodies, and Cars for Mines, Quarries, and Earth Moving Projects

### Electric Steel Foundry Co.

2141 N. W. 25th Ave., Portland 10, Oreg., and 1017 Griggs St., Danville, Ill.

Dragline Buckets, Shovel Dippers, Bucket Teeth, Crusher Wearing Parts, Cutting Edges and End Bits

### Ensign-Bickford Co.

Simsbury, Conn.

Primacord-Bickford Detonating Fuse and Safety Fuse



## Manufacturers Division — National Crushed Stone Association

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### Euclid Division

#### General Motors Corp.

1361 Chardon Road, Cleveland 17, Ohio  
Heavy-Duty Trucks and Dump Trailers for  
"Off-Highway" Hauls, Loaders for Earth Ex-  
cavation, Single and Twin Engine Earth  
Moving Scrapers, Crawler Tractors

### Frog, Switch & Mfg. Co.

#### Manganese Steel Department

Carlisle, Pa.

"Indian Brand" Manganese Steel Castings for  
all Types of Jaw, Gyratory, and Pulveriz-  
ing Crushers; Dippers, Teeth, Treads, and  
Other Parts for Power Excavating Equip-  
ment; and Other Miscellaneous Manganese  
Steel Castings. Manufacturers and Fabri-  
cators of Railroad and Mine Frogs, Switches,  
and Crossings

### General Electric Co.

1 River Road, Schenectady 5, N. Y.

Electric Motors, Controls, Locomotives, Weld-  
ing Equipment, Coordinated Electric Drives  
for: Shovels, Drag Lines, Conveyors, Hoists,  
Cranes, Crushers, Screens, Etc.; Coordinated  
Power Generating and Distributing Systems  
Including Generators, Switchgear, Trans-  
formers, Cable, Cable Skids, Load Center  
Substations

### Gill Rock Drill Co., Inc.

Lebanon, Pa.

Well Drill Tools and Supplies

### Goodyear Tire & Rubber Co., Inc.

Akron 16, Ohio

Airfoam; Industrial Rubber Products—Belting  
(Conveyor, Elevator, Transmission), Hose  
(Air, Water, Steam, Suction, Miscellaneous);  
Chute Lining (Rubber); Rims (Truck and  
Tractor); Storage Batteries (Automobile,  
Truck, Tractor); Tires (Automobile, Truck,  
Off-the-Road); Tubes (Automobile, Truck,  
Off-the-Road, LifeGuard, Safety Tubes,  
Puncture Seal Tubes)

### Gruendler Crusher and Pulverizer Co.

2915 North Market St., St. Louis 6, Mo.

Rock and Gravel Crushing, Screening and  
Washing Plants, Jaw Crushers, Roll Crush-  
ers, Hammermills, Lime Pulverizers

### Gulf Oil Corp.

#### Gulf Refining Co.

Gulf Bldg., Pittsburgh 19, Pa.

Lubricating Oils, Greases, Gasoline and Diesel  
Fuels

### Haiss, George, Mfg. Co., Inc.

#### Division of Pettibone Mulliken Corp.

5720 Empire State Bldg., New York 1, N. Y.

Bucket Loaders, Buckets, Portable and Sta-  
tionary Conveyors, Car Unloaders

### Harnischfeger Corp.

4400 West National Ave., Milwaukee 46, Wis.

A Complete Line of Power Excavating Equip-  
ment, Overhead Cranes, Hoists, Welders,  
Electrodes, Motors and Generators, Diesel  
Engines

### HarriSteel Products Co.

420 Lexington Ave., New York 17, N. Y.

Woven Wire Screen Cloth

### Hayward Co.

50 Church St., New York 7, N. Y.

Orange Peel Buckets, Clam Shell Buckets,  
Electric Motor Buckets, Automatic Take-up  
Reels

### Heidenreich, E. Lee, Jr.

#### Consulting Engineers

75 Second St., Newburgh, N. Y.

Plant Layout, Design, Supervision; Open Pit  
Quarry Surveys; Appraisals — Plant and  
Property

### Hendrick Mfg. Co.

Carbondale, Pa.

Perforated Metal Screens, Perforated Plates  
for Vibrating, Shaking, and Revolving  
Screens; Elevator Buckets; Test Screens;  
Wedge Slot Screens; Wedge Wire Screens;  
Open Steel Floor Grating

### Hercules Powder Co.

Wilmington 99, Del.

Explosives and Blasting Supplies

### Hetherington & Berner Inc.

701-745 Kentucky Ave., Indianapolis 7, Ind.

Asphalt Paving Machinery, Sand and Stone  
Dryers

### Hewitt-Robins Incorporated

666 Glenbrook Road, Stamford, Conn.

Belt Conveyors (Belting and Machinery); Belt  
and Bucket Elevators; Car Shakeouts; Feed-  
ers; Industrial Hose; Screen Cloth; Sectional  
Conveyors; Skip Hoists; Stackers; Trans-  
mission Belting; Vibrating Conveyors, Feed-  
ers, and Screens; Design and Construction  
of Complete Plants; Molded Rubber Goods;  
Sheet Packing; Transmission Belting; De-  
waterizers; Wire Conveyor Belts; Speed Re-  
ducers; Gears; Pulleys; Sheaves; Couplings

### Howe Scale Co.

Strongs Ave., Rutland, Vt.

Scales, Static Weighing and Motion Weighing  
Devices, Automatic Batching Equipment,  
and Hand Trucks

### Hoyt Wire Cloth Co.

Abraso St., off Manheim Pike, Lancaster, Pa.

Aggregate Wire Screens Made of Supertough,  
Abraso, and Stainless Steel Wire—Smooth-  
top, Longslot, Oblong Space, and Double  
Crimp Construction—For All Makes of  
Vibrators

### Hughes Tool Co.

P. O. Box 2539, Houston 1, Texas

Bits—Rock



## Manufacturers Division – National Crushed Stone Association

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### Illinois Powder Mfg. Co.

506 Olive St., St. Louis 1, Mo.  
Gold Medal Explosives

### Independent Explosives Co.

455 Leader Bldg., Cleveland 14, Ohio  
Commercial High Explosives

### Ingersoll-Rand Co.

11 Broadway, New York 4, N. Y.

Rock Drills, Paving Breakers, Paving Breaker Accessories, Quarrymaster Drills, Drillmasters, Carset Bits, Jackbits, Bit Reconditioning Equipment, Portable and Stationary Air Compressors, Air Hoists, Slusher Hoists, Pneumatic Tools, Centrifugal Pumps, Diesel and Gas Engines

### Insley Manufacturing Corp.

801 North Olney St., Indianapolis 6, Ind.

1/2 to 2 Cu. Yd. Cranes and Shovels—5 to 35 Tons Capacity, Rubber or Crawler Mounting; Concrete Carts and Buckets

### International Harvester Co.

#### Construction Equipment Division

P. O. Box 270, Melrose Park, Ill.  
Tractors (Crawlers) and Equipment

### Iowa Manufacturing Co.

916 16th St., N.E., Cedar Rapids, Iowa

Rock and Gravel Crushing, Screening, Conveying and Washing Plants, Asphalt Plants, Stabilizer Plants, Impact Breakers, Screens, Elevators, Conveyors, Portable and Stationary Equipment, Hammermills, Bins

### Jaeger Machine Co.

550 West Spring St., Columbus 16, Ohio

Portable and Stationary Air Compressors, Self-Priming Pumps, Truck Mixers, Concrete Mixers, Road Paving Machinery, Hoists and Towers; Rubber-Tired, Front End Loaders

### Jeffrey Manufacturing Co.

East First Ave., Columbus 16, Ohio

Elevator Buckets; Car Pullers; Chains; Conveyors; Belt, Drag, Apron, Vibrating; Idlers; Crushers; Pulverizers; Elevators; Feeders; Pillow Blocks; Stationary Plants; Screens

### Johnson-March Corp.

1724 Chestnut St., Philadelphia 3, Pa.

Dust Control Engineers, Chem-Jet Dust Control Systems, Gas Scrubbers

### Joy Manufacturing Co.

333 Henry W. Oliver Bldg., Pittsburgh 22, Pa.

Drills: Blast-Hole, Wagon, Rock, and Core; Air Compressors: Portable, Stationary, and Semi-Portable; Aftercoolers; Portable Blowers; Carpullers; Hoists; Multi-Purpose and Portable Rock Loaders; Air Motors; Trench Diggers; Belt Conveyors; "Spaders"; "String-a-Lite" (Safety-Lighting-Cable); Backfill Tampers; Drill Bits: Rock and Core

### Kennedy-Van Saun Mfg. & Eng. Corp.

2 Park Ave., New York 16, N. Y.

Crushing, Screening, Washing, Conveying, Elevating, Grinding, Complete Cement Plants, Complete Lime Plants, Complete Lightweight Aggregate Plants, Synchronous Motors, Air Activated Containers for Transportation of Pulverized Material, Cement Pumps, and Power Plant Equipment

### Kensington Steel Co.

505 Kensington Ave., Chicago 28, Ill.

Oro Alloy and Manganese Steel Castings: For Shovels—Dipper Teeth, Crawler Treads, Rollers, Sprockets; For Crushers—Jaw Plates, Concaves, Mantles, Bowl Liners; For Pulverizers—Hammers, Grate Bars and Liners; For Elevators and Conveyors—Chain, Sprockets, Buckets; For Tractors—Rail Links and Grouser Plates; Drag Line Chain

### King Powder Co., Inc.

Cincinnati, Ohio

Detonite, Dynamites, and Blasting Supplies

### Koehring Co.

3026 West Concordia Ave., Milwaukee 16, Wis.

Excavating, Hauling, and Concrete Equipment

### Linde Air Products Co., Division of Union Carbide and Carbon Corp.

30 East 42nd St., New York 17, N. Y.

Oxygen, Acetylene, Welding and Jet Piercing Equipment and Supplies

### Link-Belt Co.

300 West Pershing Road, Chicago 9, Ill.

Complete Stone Preparation Plants; Conveyors, Elevators, Screens, Washing Equipment, Speed-O-Matic Shovels—Cranes—Draglines and Power Transmission Equipment

### Link-Belt Speeder Corp.

1201 Sixth St., S. W., Cedar Rapids, Iowa

Complete Line of Power Hydraulically Controlled Cranes, Shovels, Hoes, Draglines, Clamshells, 1/2 to 3 Yd. Capacities. Available on Crawler Base or Rubber Tire Mounting

### Lippmann Engineering Works, Inc.

4603 W. Mitchell St., Milwaukee 14, Wis.

Primary and Secondary Rock Crushers and Auxiliary Equipment such as Feeders, Screens, Conveyors, Etc., Portable and Stationary Crushing and Washing Plants

### Ludlow-Saylor Wire Cloth Co.

634 South Newstead Ave., St. Louis 10, Mo.

Woven Wire Screens and Wire Cloth of Super-Loy, Steel, and All Other Commercial Alloys and Metals

## Manufacturers Division – National Crushed Stone Association

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### Mack Trucks, Inc.

1355 W. Front St., Plainfield, N. J.

On- and Off-Highway Trucks, Tractor-Trailers, Six-Wheelers, from 5 to 100 Tons Capacity, Both Gasoline- and Diesel-Powered

### Manganese Steel Forge Co.

Richmond St. & Castor Ave., Phila. 34, Pa.

ROL-MAN 11.00 to 14.00 Per Cent Rolled Manganese Steel Woven and Perforated Screens, and Fabricated Parts for Aggregate Handling Equipment

### Marion Power Shovel Co.

Marion, Ohio

Power Shovels, Draglines, Cranes, Truck Cranes—From 1/2 to 75 Yd.

### McLanahan & Stone Corp.

252 Wall St., Hollidaysburg, Pa.

Complete Pit, Mine, and Quarry Equipment—Crushers, Washers, Screens, Feeders, Etc., Semi-Portable Plants

### Murphy Diesel Co.

5317 West Burnham St., Milwaukee 14, Wis.

Engines—Industrial Engine, and Power Units for Operation on Diesel and Dual Fuel Engines. Generator Sets, AC and DC from 64 Kw. to 165 Kw. Mech-Elec Unit—Combination Mechanical and Electric Power Furnished Simultaneously

### National Container Corp. of Ohio

Multi-Wall Paper Bag Division

Jaite, Ohio

Multi-wall Paper Bags, Sewn and Pasted Style for Packaging Lime, Cement, Plaster, Etc.

### New York Rubber Corp.

100 Park Ave., New York 17, N. Y.

Conveyor Belting: Stenore, Dependable, and Cameo Grades; Transmission Belting: Silver Duck Duroflex, Soft Duck Rugged, Commercial Grade Tractor

### Nordberg Mfg. Co.

Milwaukee 1, Wis.

Symons Cone Crushers, and Symons Gyratory and Impact Crushers; Gyradisc Crushers; Grinding Mills; Stone Plant and Cement Mill Machinery; Vibrating Screens and Grizzlies; Diesel Engines and Diesel Generator Units; Mine Hoists; Railway Track Maintenance Machinery

### Northern Blower Co.

6409 Barberton Ave., Cleveland 2, Ohio

Dust Collecting Systems, Fans—Exhaust and Blower

### Northwest Engineering Co.

135 South LaSalle St., Chicago 3, Ill.

Shovels, Cranes, Draglines, Pullshovels—Crawler and Truck Mounted

### Pennsylvania Crusher Division

Bath Iron Works Corp.

323 South Matlack St., West Chester, Pa.

Single Roll Crushers, Impactors, Reversible Hammermills, Ring Type Granulators, Kue-Ken Jaw Crushers, Kue-Ken Gyratories, Non-Clog and Standard One-Way Hammermills

### Pettibone Mulliken Corp.

4710 West Division St., Chicago 51, Ill.

Material Handling Buckets, Clamshells, Draglines, Pullshovels, Dippers, Shovel Dippers, Pumps, Front End Loaders, Bucket Conveyor Loaders, Fork and Bucket Loaders, Speed Swing Loaders, Speed Swing Yard Cranes, Motor Graders, Manganese Steel Castings

### Pioneer Engineering Works, Inc.

3200 Como Ave., Minneapolis 14, Minn.

Jaw Crushers, Roll Crushers (Twin and Triple), Impact Crushers, Vibrating and Revolving Screens, Feeders (Reciprocating, Apron, and Pioneer Oro Manganese Steel), Belt Conveyors, Idlers, Accessories and Trucks, Portable and Stationary Crushing and Screening Plants, Washing Plants, Mining Equipment, Cement and Lime Equipment, Asphalt Plants, Mixers, Dryers and Pavers

### Pit and Quarry Publications, Inc.

431 South Dearborn St., Chicago 5, Ill.

Pit and Quarry, Pit and Quarry Handbook, Pit and Quarry Directory, Concrete Manufacturer, Concrete Industries Yearbook, Equipment Distributor's Digest

### Productive Equipment Corp.

2926 West Lake St., Chicago 12, Ill.

Vibrating Screens

### Quaker Rubber Division

H. K. Porter Co., Inc.

Tacony and Comly Sts., Philadelphia 24, Pa.  
Conveyor Belts, Hose, and Packings

### Radio Corporation of America

Inspection and Control Section

Front and Cooper Sts., Bldg. 15-1  
Camden 2, N. J.

Tramp Metal Detectors

### Rock Products and Concrete Products

79 West Monroe St., Chicago 3, Ill.

### Rogers Iron Works Co.

11th & Pearl Sts., Joplin, Mo.

Jaw Crushers, Roll Crushers, Hammermills, Vibrating Screens, Revolving Screens and Scrubbers, Apron Feeders, Reciprocating Feeders, Roll Grizzlies, Conveyors, Elevators, Portable and Stationary Crushing and Screening Plants, Mine Hoists, Drill Jumbos and Underground Loaders

### Screen Equipment Co., Inc.

1754 Walden Ave., Buffalo 25, N. Y.

Seco Vibrating Screens; Scales—Industrial, Aggregates, Truck

## Manufacturers Division – National Crushed Stone Association

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### **Simplicity Engineering Co.**

Durand, Mich.

*Simplicity Gyrating Screens, Horizontal Screens, Simpli-Flo Screens, Tray Type Screens, Heavy Duty Scalpers, D'Watering Wheels, D'Centegrators, Vibrating Feeders, Vibrating Pan Conveyors, Car Shake-Outs, Woven Wire Screen Cloth, Grizzly Feeders*

### **SKF Industries, Inc.**

Front St. and Erie Ave.,  
P. O. Box 6731, Philadelphia 32, Pa.

*Anti-Friction Bearings—Self-Aligning Ball, Single Row Deep Groove Ball, Angular Contact Ball, Double Row Deep Groove Ball, Spherical Roller, Cylindrical Roller, Ball Thrust, Spherical Roller Thrust; Tapered Roller Bearings; Pillow Block and Flanged Housings—Ball and Roller*

### **Smith Engineering Works**

532 East Capitol Drive, Milwaukee 12, Wis.

*Gyratory, Gyrasphere, Jaw and Roll Crushers, Vibrating and Rotary Screens, Gravel Washing and Sand Settling Equipment, Elevators and Conveyors, Feeders, Bin Gates, and Portable Crushing and Screening Plants*

### **Stedman Foundry & Machine Co., Inc.**

Aurora, Ind.

*Stedman Impact-Type Selective Reduction Crushers, 2-Stage Swing Hammer Limestone Pulverizers, Multi-Cage Limestone Pulverizers, Vibrating Screens*

### **Stephens-Adamson Mfg. Co.**

Aurora, Ill.

*Belt Conveyors, Bearings, Elevators, Manganese Feeders, Car Pullers, Pulleys, Screens, Speed Reducers, Complete Plants*

### **Taylor-Wharton Co.**

Division Harsco Corp.

High Bridge, N. J.

*Manganese and Other Special Alloy Steel and Iron Castings; Dipper Teeth, Fronts and Lips; Crawler Treads; Jaw and Cheek Plates; Mantles and Concaves; Pulverizer Hammers and Liners; Asphalt Mixer Liners and Tips; Manganese Nickel Steel Welding Rod and Plate; Elevator, Conveyor and Dredge Buckets*

### **Thew Shovel Co.**

East 28th St. and Fulton Rd., Lorain, Ohio

*"Lorain" Power Shovels, Cranes, Draglines, Clamshells, Hoes, Scoop Shovels on Crawlers and Rubber-Tire Mountings. Diesel, Electric, and Gasoline, 3/8 to 2-1/2 Yd. Capacities*

### **Thor Power Tool Co.**

175 North State St., Aurora, Ill.

*Thor Power Tools, Wagon Drills, Rock Drills, Sump Pumps*

### **Torrington Co.**

Bantam Bearings Division

3702 West Sample St., South Bend 21, Ind.

*Anti-Friction Bearings; Self-Aligning Spherical, Tapered, Cylindrical, and Needle Roller; Roller Thrust; Ball Bearings*

### **Travel Drill Co.**

P. O. Box 1124, Raleigh, N. C.

*"Travel Drill"—Mobile Drill for Secondary Drilling in Quarries and Open Pit Work*

### **Traylor Engineering & Mfg. Co.**

Allentown, Pa.

*Stone Crushing, Gravel, Lime, and Cement Machinery*

### **Trojan Powder Co.**

17 North Seventh St., Allentown, Pa.

*Explosives and Blasting Supplies*

### **Tyler, W. S., Co.**

3615 Superior Ave., N.E., Cleveland 14, Ohio

*Woven Wire Screens; Ty-Rock, Tyler-Niagara and Ty-Rocket (Mechanically Vibrated) Screens; Hum-mer Electric Screens; Ro-Tap Testing Sieve Shakers, Tyler Standard Screen Scale Sieves, U. S. Sieve Series*

### **Universal Engineering Corp.**

625 C Ave., N.W., Cedar Rapids, Iowa

*Jaw Crushers, Roll Crushers, TwinDual Roll Crushers, Hammermills, Impact Breakers. Pulverizers, Bins, Conveyors, Feeders, Screens, Scrubbers. Bulldog Non-Clog Moving Breaker Plate and Stationary Breaker Plate Hammermills, Center Feed Hammermills. A Complete Line of Stationary and Portable Crushing, Screening, Washing, and Loading Equipment for Rock, Gravel, Sand, and Ore. Aglime Plants. Asphalt Plants*

### **Vibration Measurement Engineers**

7665 Sheridan Road, Chicago 26, Ill.

*Seismographic and Airblast Measurements, Seismological Engineering, Blasting Complaint Investigations, Expert Testimony in Blasting Litigation; Nation-wide Coverage; A Complete Seismograph Rental and Record Analysis Service with "Seismolog"*

### **Werco Steel Co.**

2151 East 83rd St., Chicago 17, Ill.

*Castings—Manganese, Alloy Steel; Screen Plates—Perforated Steel Screen Sections and Decks; Buckets; Chains; Belt Conveyors, Idlers; Dipper—Shovel; Drop Balls; Wire Cloth; Wire Rope and Related Products; Crushers, Pulverizers*

### **White Motor Co.**

842 East 79th St., Cleveland 1, Ohio

*On- and Off-Highway Trucks and Tractors—Gasoline- and Diesel-Powered; Industrial Engines—Gasoline and Diesel; Power Units, Axles, Special Machine Assemblies; Crane and Shovel Carriers; Power Generating and Distributing Systems; Batteries; All Classes of Maintenance and Repair Services*

### **Wickwire Spencer Steel Division**

Colorado Fuel and Iron Corp.

575 Madison Ave., New York 22, N. Y.

*Wire Rope, Vibrating and Space Screens, Screen Plate—Perforated Steel*

### **Williams Patent Crusher & Pulverizer Co.**

2701-2723 North Broadway, St. Louis 6, Mo.

*Hammer Mills, Crushers, Pulverizers, Roller Mills, Reversible Impactors, and Vibrating Screens, and Air Separators*

